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SCHOOL OF SCIENCE

OREGON STATE COLLEGE



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COLUMBIA RIVER

ALSEA R.

USLA R.

GOOS BAY

**Physical Hydrographic Data
Offshore from Newport, Ore.
For July 1958 to July 1959**

by
Bruce Wyatt
and
Richard Callaway

Office of Naval Research
Contract Nonr. 1286 (C2)
Project NR 383-102

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Data Report No. 4 January 1961
Reference 61-1

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Department of Oceanography

SCHOOL OF SCIENCE

OREGON STATE COLLEGE

Corvallis, Oregon

PHYSICAL HYDROGRAPHIC DATA OFFSHORE

FROM NEWPORT, OREGON, FOR JULY 1958

TO JULY 1959

by

Bruce Wyatt

and

Richard Callaway

Data Report No. 4

Office of Naval Research

Contract Nonr 1286 (02)

Project NR 083-102

Reference 61-1
January 1961

Wayne V. Burt
Chairman

671 500

INTRODUCTION

The Department of Oceanography at Oregon State College initiated an oceanographic survey of the Oregon coast on July 1, 1958. The purpose of this report is to present salinity, temperature, and oxygen data collected for the interval from July 1958 to July 1959, and to present a preliminary interpretation of the results.

PROCEDURE

Coast Guard vessels of 40 and 52 feet in length stationed at Newport and commanded by BMI McAdams and BMI Dwyer were used to make surveys at the stations which were located at five mile intervals, from the intersections of the south jetty of Yaquina Bay and the beach to 25 miles offshore, (Figure 1). Samples from the surface, 50 and 100 feet were obtained at each station with the aid of a Frautschy or Kemmerer bottle. Generally the wire angles were negligible. However, an additional four feet of wire was payed out with wire angles between 5° and 10° . Temperatures were taken on deck with a bucket thermometer. Although no tests were made, the accuracy of the temperature measurements was estimated as 0.2°C . Salinity and oxygen samples were analyzed in the laboratory by standard methods.

INDICATIONS OF WATER MASS CHARACTERISTICS OFF NEWPORT, OREGON

Upwelled water has a relatively high salinity, and a relatively low temperature and dissolved oxygen content. Early indications show that during part of the summer a narrow band of upwelling exists to at least five miles and possibly to 15 miles offshore from Newport. Salinities of 33.31/00, $32.70^{\circ}/00$, and 32.63/00 were present at stations 1, 2, and 3 off Newport in August, 1958 (Table 1). Similar values were obtained during the September and October cruises at these same stations (Table 1 and Figures 4 and 5). Associated with these high salinities, relatively low temperatures were recorded (Station 1, July, 15.2°C ., Station 1, August, 10.9°C ., Station 1, September, 11.4°C .,) further substantiating the presence of upwelling, Figure 4 and Table 1.

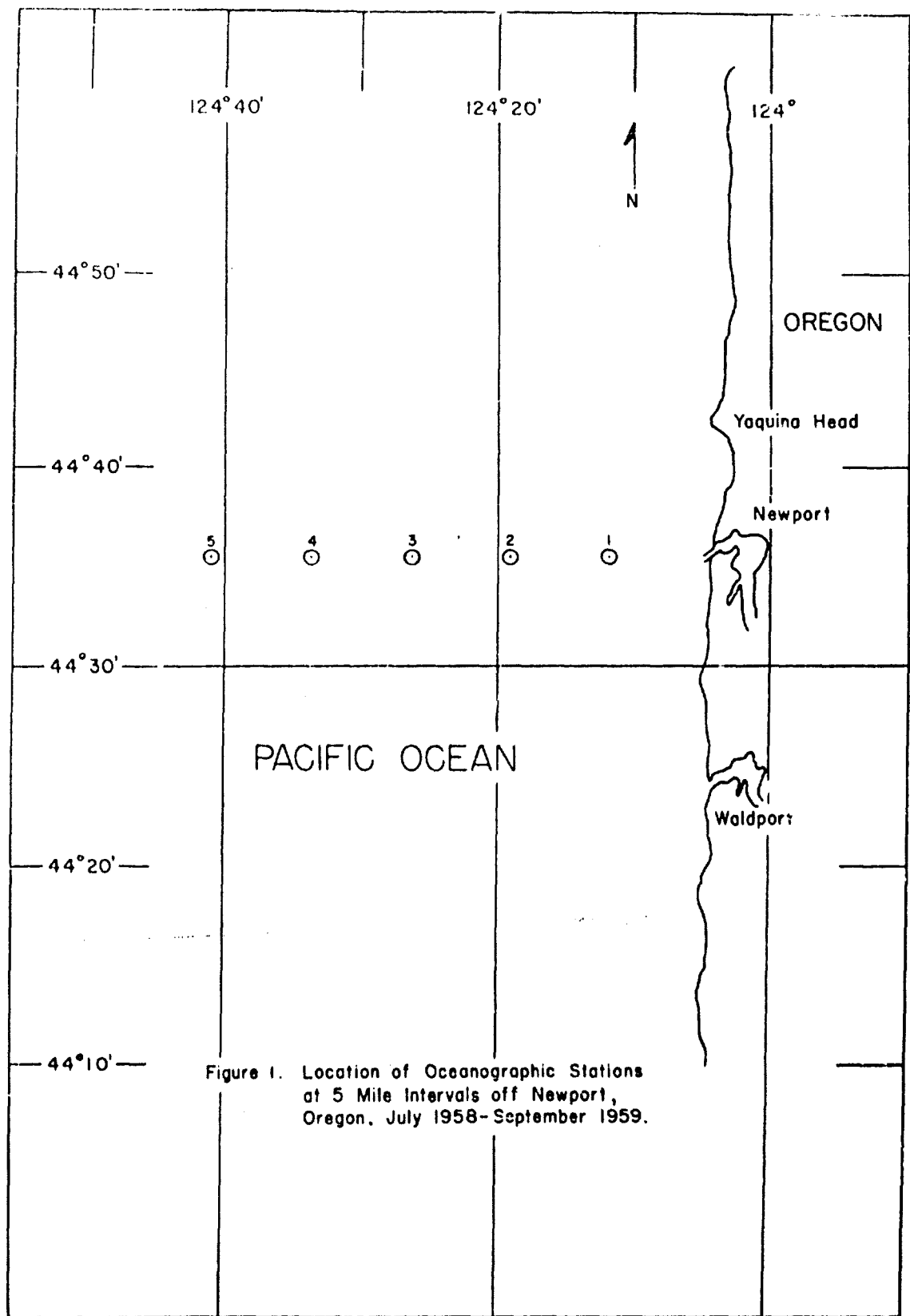
According to Reid, Roden and Wyllie (1956), the California current system at its upper latitudes should have a minimum salt content of about 32.5‰. Lower salinity water might result from the influence of the Columbia River or other coastal runoff. Surface salinity values at Station 3 (15 mile station) for July and September were 29.00‰, and 31.92‰ respectively, (Figures 3 and 4 and Table 1), indicating the possible presence of Columbia River water. Salinity and temperature results obtained during cruises made in November, January, March, and April are more difficult to interpret. More extensive observations made by the U. S. Coast and Geodetic Survey R/V EXPLORER in February of 1960 and by Oregon State College Department of Oceanography should provide indications of winter circulation off the Oregon coast.

DISTRIBUTION OF PROPERTIES

Survey data are presented graphically. Figure 2 is a vertical time section of temperature, salinity, and dissolved oxygen at the 10 mile station off Newport. Figures 3 through 8 are vertical sections of salinity, dissolved oxygen, sigma t, and temperature for stations occupied from July 1, 1958 to June 2, 1959. Observations used to construct curves are presented in Table 1.

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- Reid, J. L. Jr., G. I. Roden, and J. G. Wyllie (1958). Studies of the California Current system. Calif. Coop. Oceanic Fisheries Invest., Progress Report, July 1956 to January 1958, 28-56.
- U. S. Hydrographic Office (1955). Instruction Manual for Oceanographic Observations. W. O. Pub. 607. pp. 1- 210.



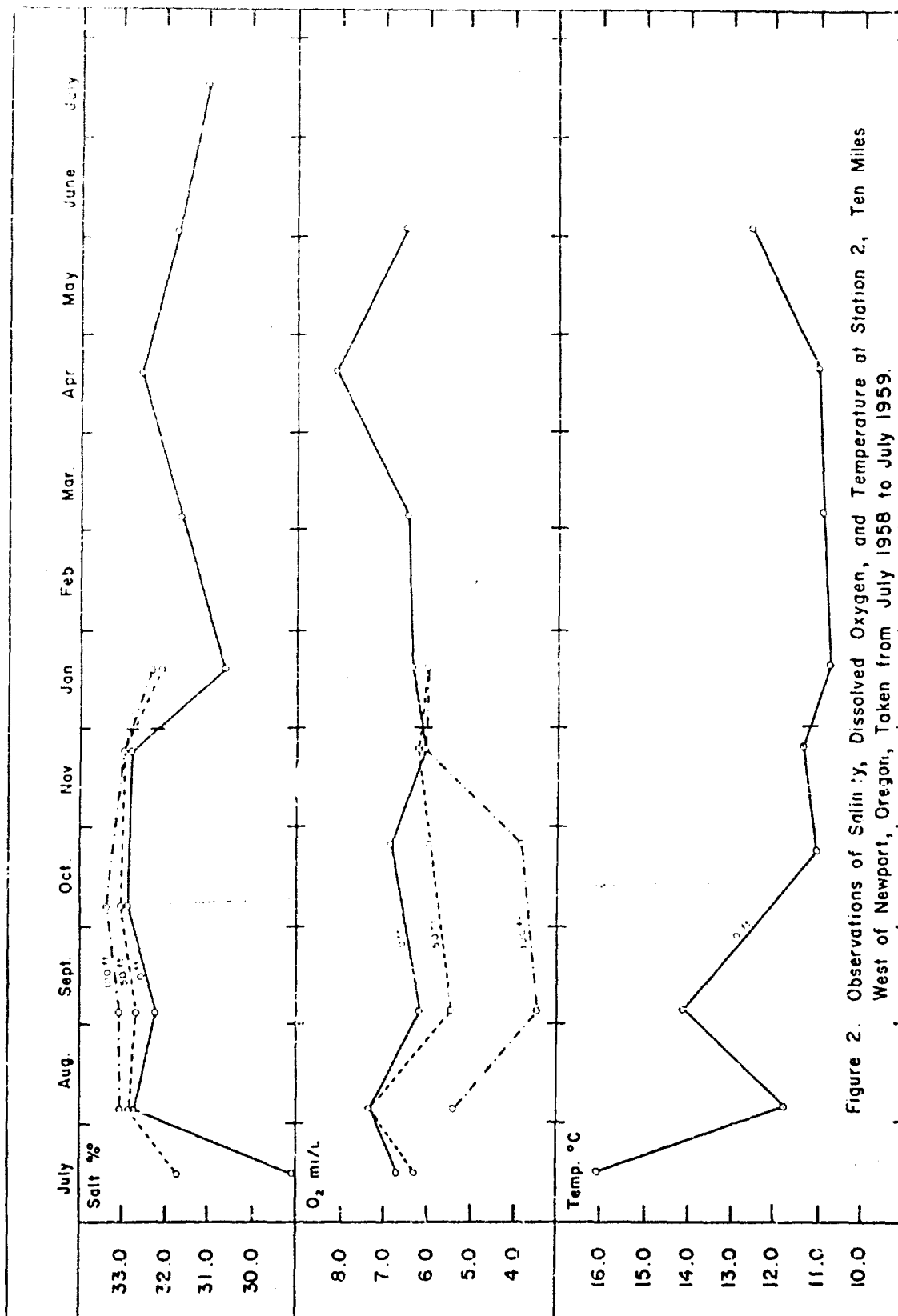


Figure 2. Observations of Salinity, Dissolved Oxygen, and Temperature at Station 2, Ten Miles West of Newport, Oregon, Taken from July 1958 to July 1959.

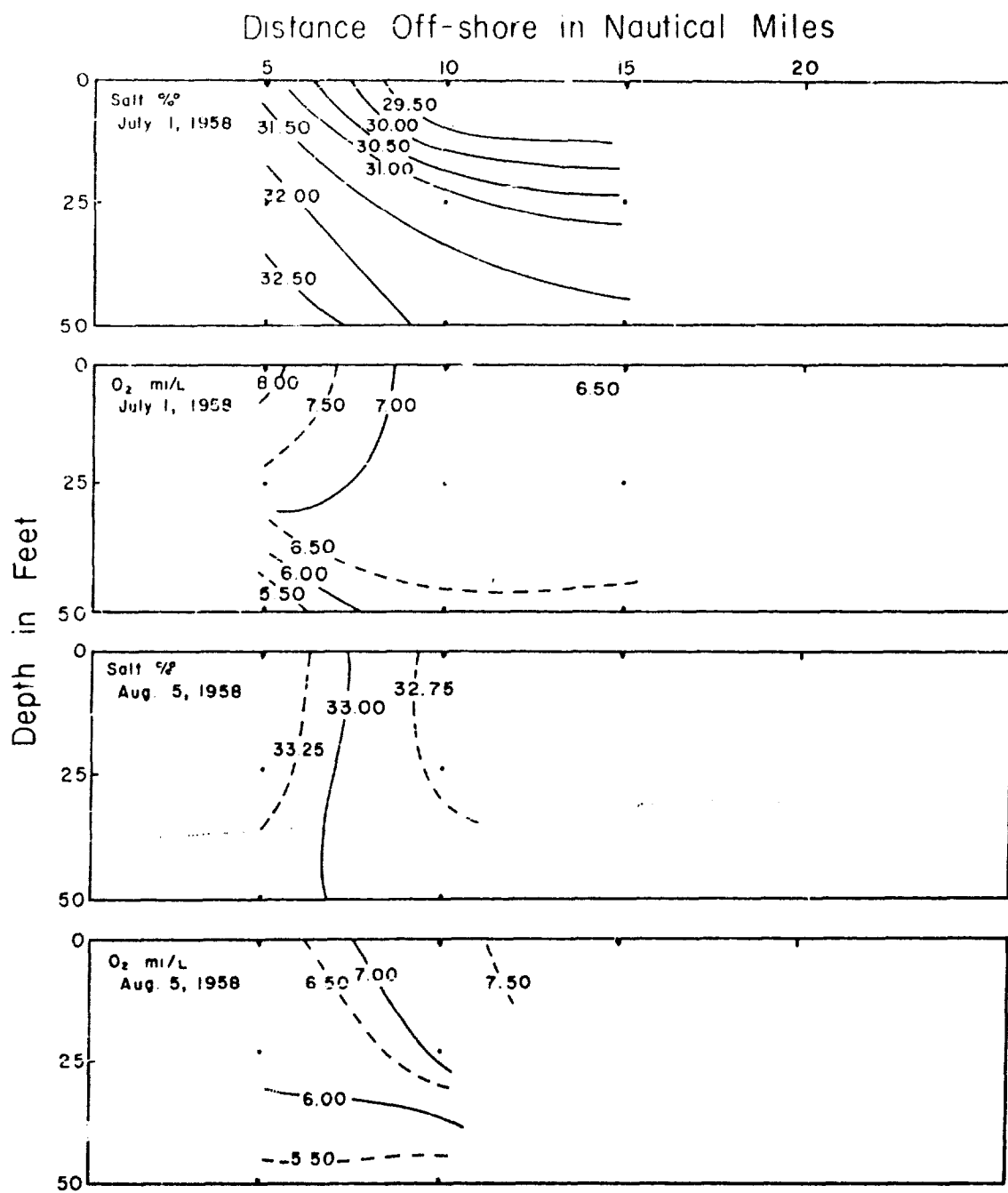


Figure 3. Vertical Distribution of Salinity and Dissolved Oxygen at Three Stations West of Newport, Oregon on July 1, 1958 and August 5, 1958.

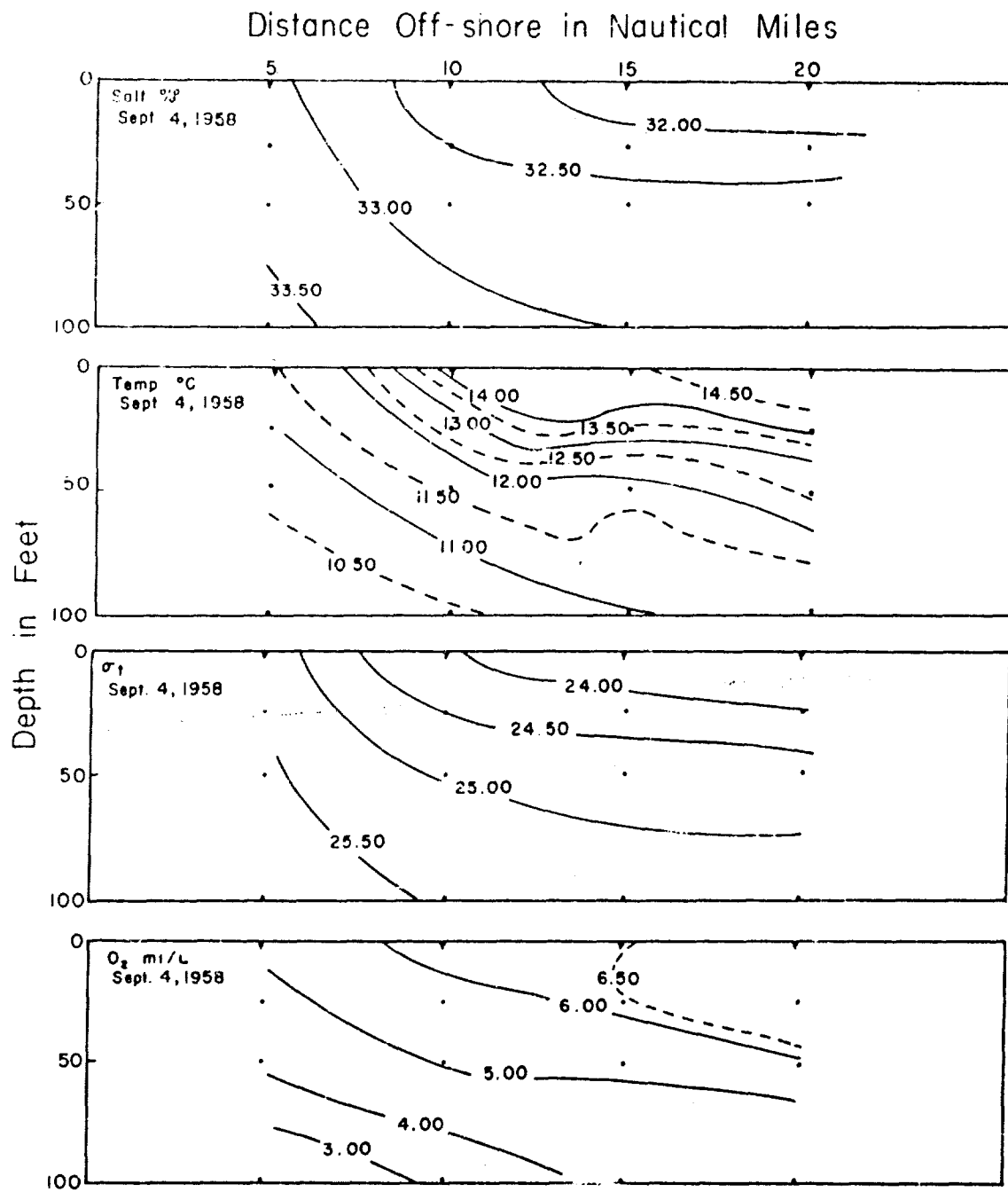


Figure 4. Vertical Distribution of Salinity, Temperature, σ_t , and Dissolved Oxygen at Four Stations West of Newport, Oregon, on September 4, 1958.

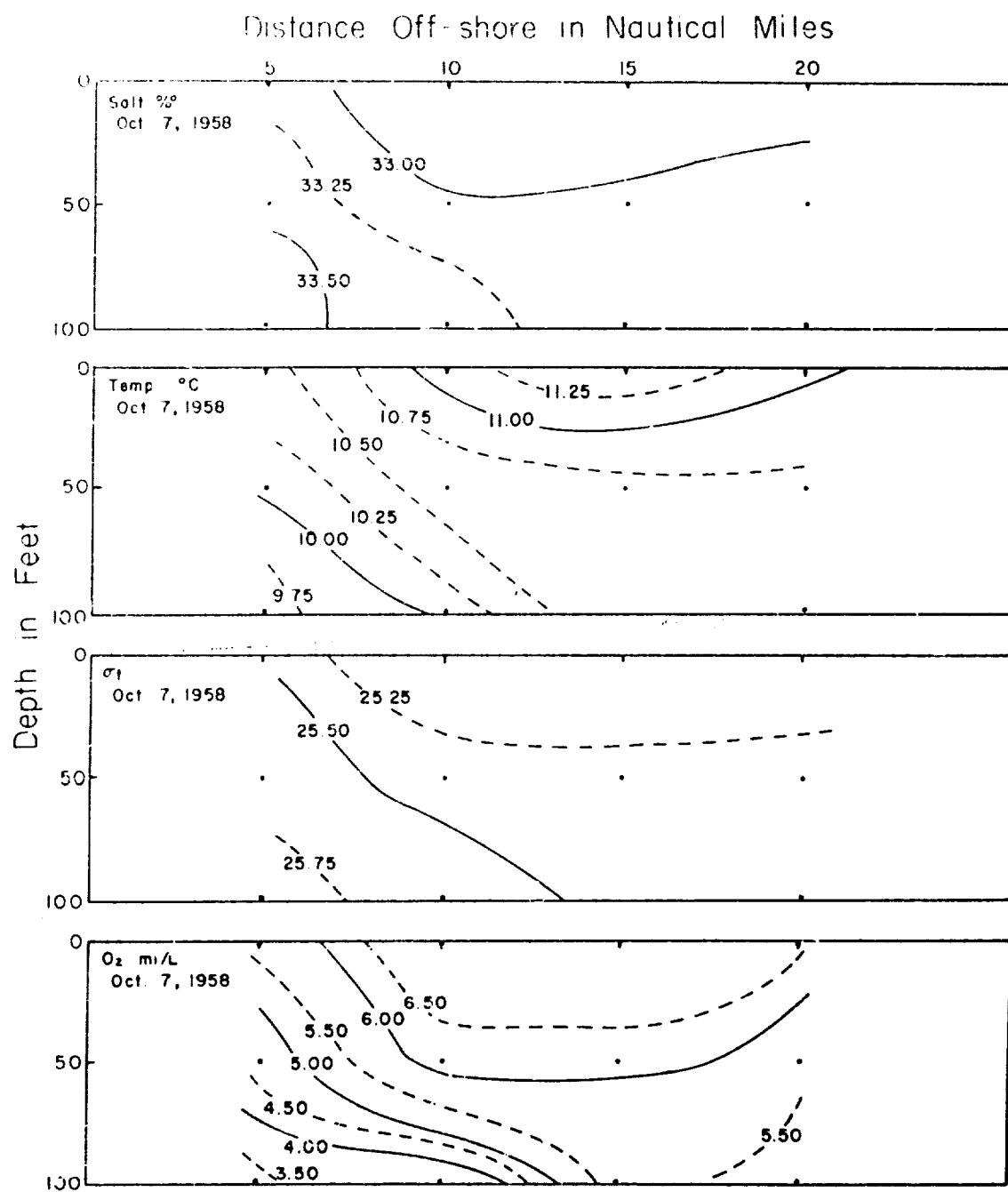


Figure 5. Vertical Distribution of Salinity, Temperature, σ_t , and Dissolved Oxygen at Four Stations West of Newport, Oregon, on October 7, 1958.

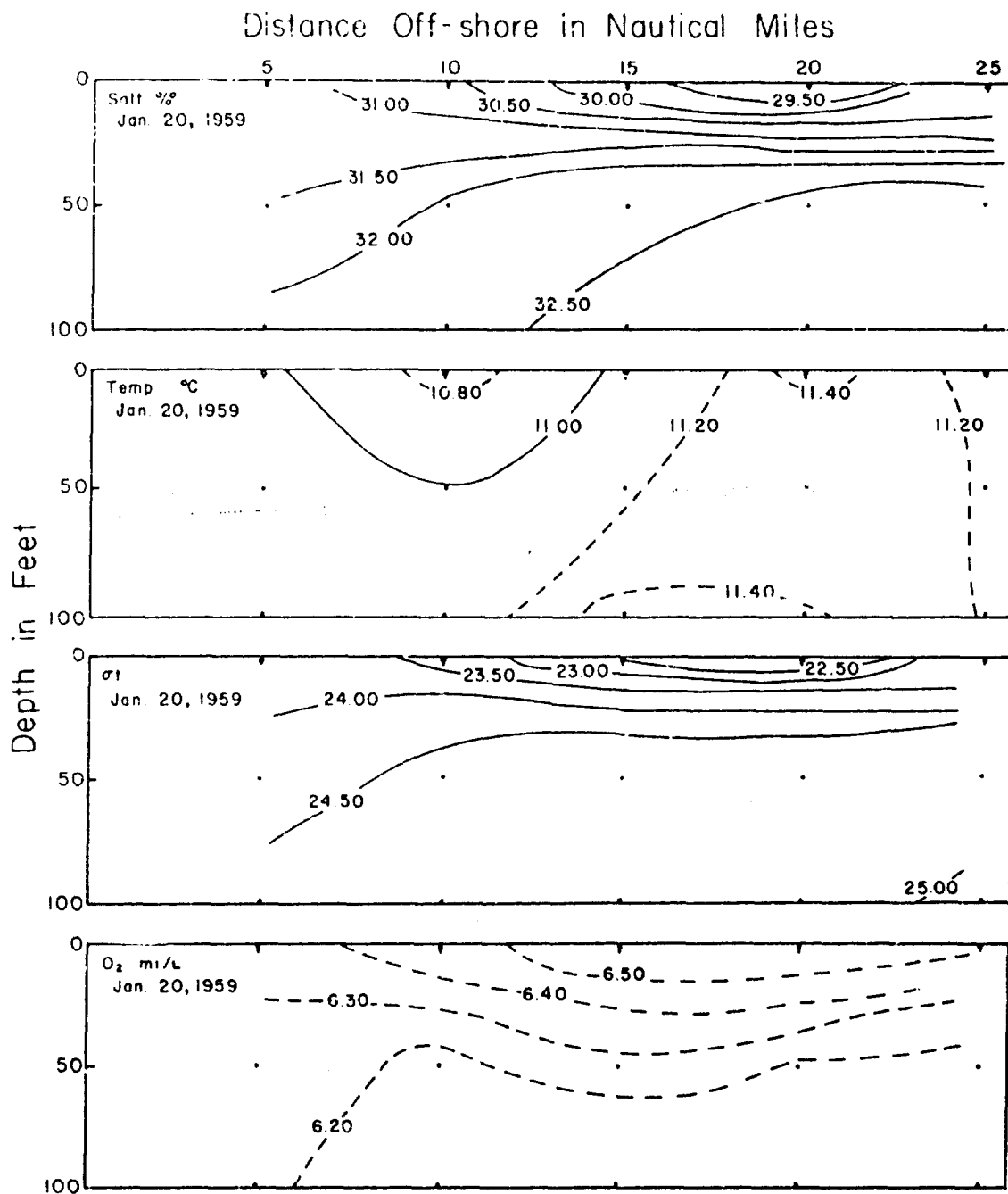


Figure 6. Vertical Distribution of Salinity, Temperature, σ_t , and Dissolved Oxygen at Five Stations West of Newport, Oregon, on January 20, 1959.

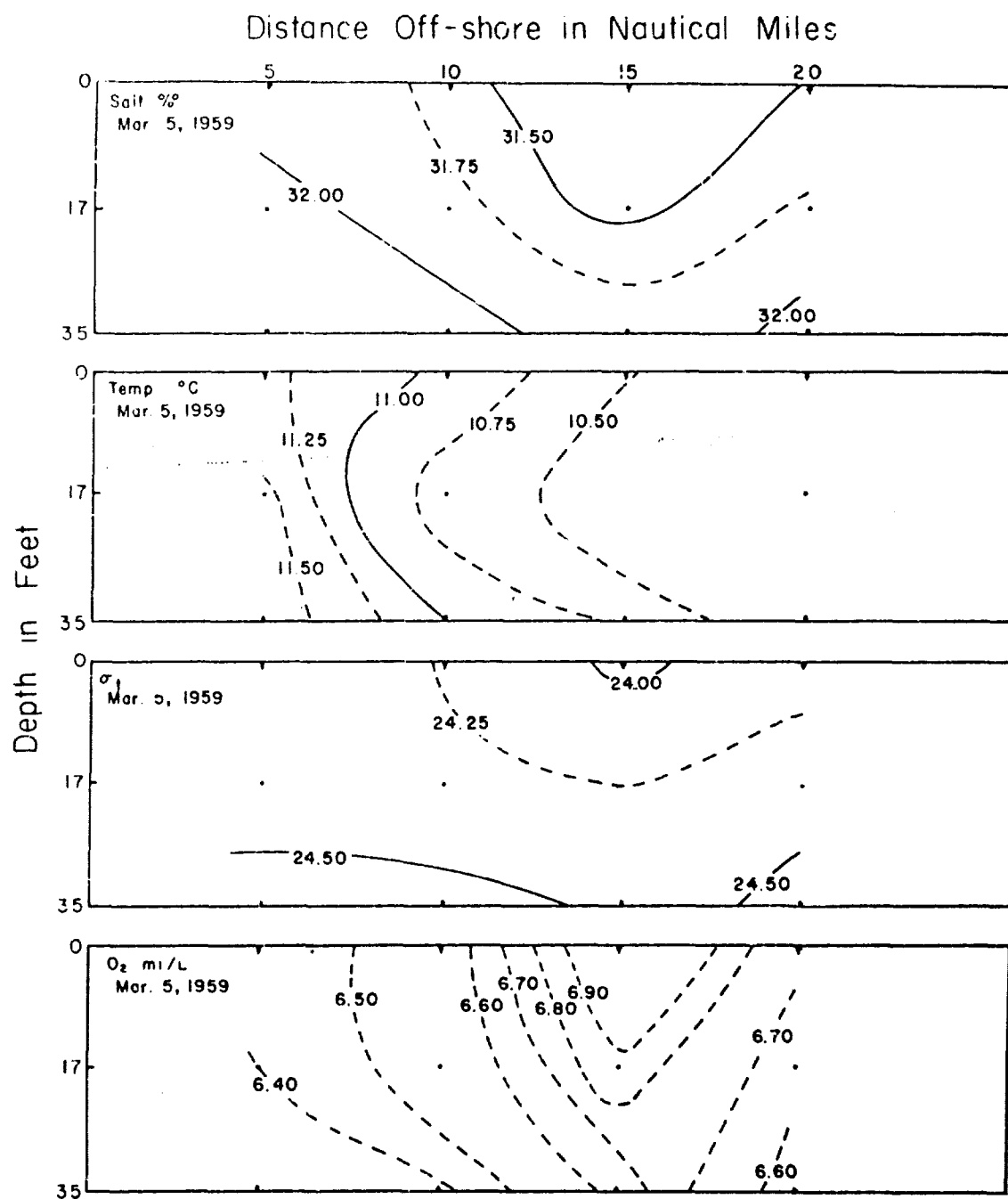


Figure 7. Vertical Distribution of Salinity, Temperature, σ_t , and Dissolved Oxygen at Four Stations West of Newport, Oregon, on March 5, 1959.

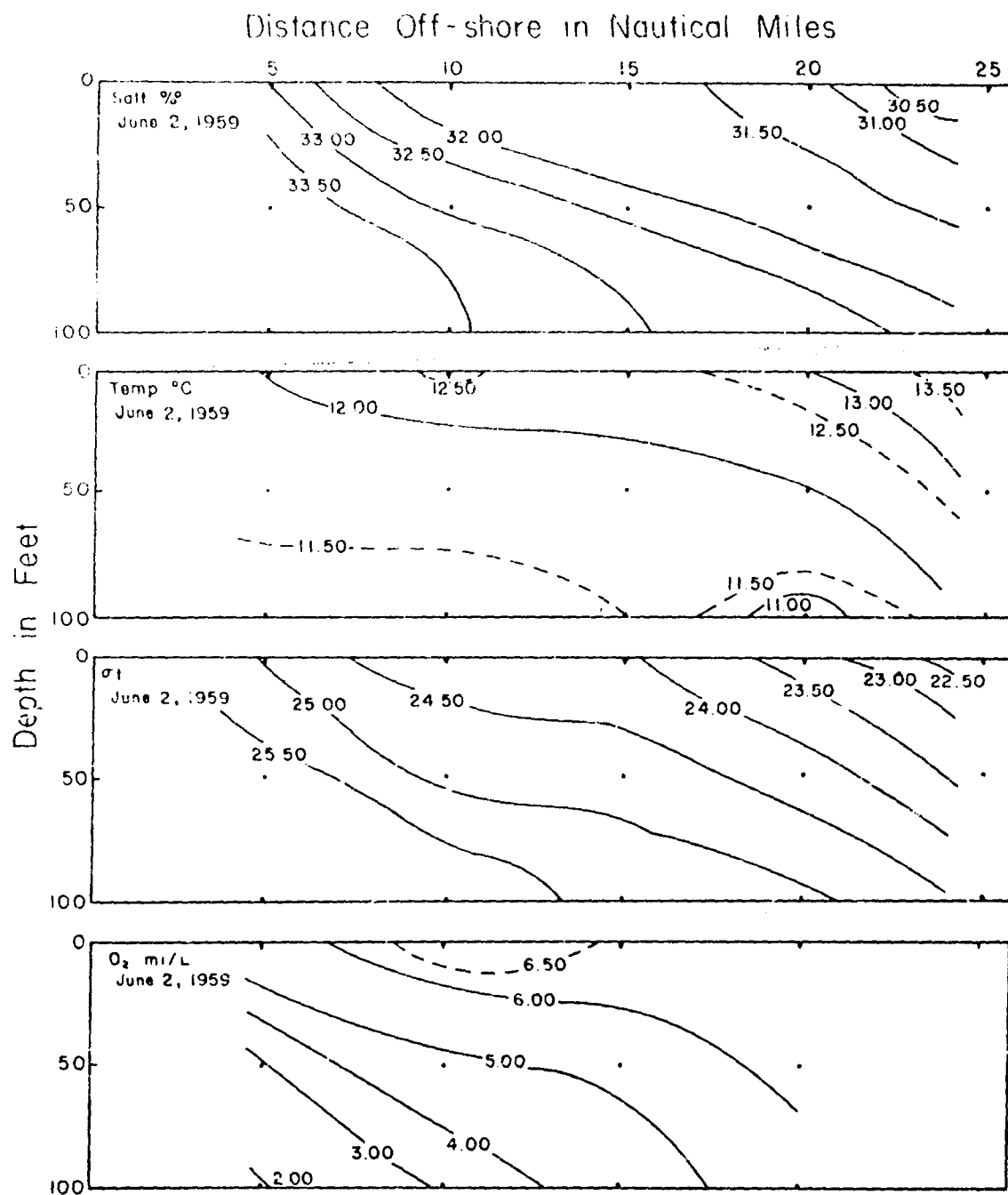


Figure 8. Vertical Distribution of Salinity, Temperature, σ_t , and Dissolved Oxygen at Five Stations West of Newport, Oregon, on June 2, 1959.

11-1. Observations of Salinity, Temperature, Sigma t, and Dissolved Oxygen
 taken from five stations located at five mile intervals
 west of Newport, Oregon from July 1, 1958, to June 2, 1959.

Station 1 44° 32.8' N				
Date 7-1-58 124° 10.9' W				
Time 0950 PST Depth 29 fathoms				
Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ _t
0	15.2	8.14	31.53	
25		7.24	32.30	
50		5.05	32.42	

Station 2 44° 32.8' N				
Date 8-5-58 124° 17.8' W				
Time 1130 PST Depth 42 fathoms				
Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ _t
0	11.9	7.27	32.70	
50		7.30	32.72	
100		5.31	32.88	

Station 2 44° 35.8' N				
Date 7-1-58 124° 17.8' W				
Time 1030 PST Depth 42 fathoms				
Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ _t
0	16.1	6.77	29.10	
25		6.71	31.27	
50		6.30	31.80	

Station 2 44° 35.8' N				
Date 8-5-58 124° 24.8' W				
Time 1155 PST Depth 37 fathoms				
Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ _t
0	12.6	7.99	32.63	

Station 3 44° 35.8' N				
Date 7-1-58 124° 24.8' W				
Time 1115 PST Depth 37 fathoms				
Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ _t
0	17.4	6.46	29.00	
25		6.68	30.73	
50		6.46	31.71	

Station 1 44° 35.8' N				
Date 9-4-58 124° 10.9' W				
Time 0955 PST Depth 29 fathoms				
Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ _t
0	11.4	5.30	33.15	25.29
25	10.8	4.50	33.26	25.48
50	10.6	4.17	33.37	25.60
100	10.1	2.74	33.69	25.93

Station 1 44° 35.8' N				
Date 8-5-58 124° 10.9' W				
Time 1100 PST Depth 29 fathoms				
Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ _t
0	10.9	6.35	31.31	
50		6.22	32.28	
100		5.60	33.21	

Station 2 44° 35.8' N				
Date 9-4-58 124° 17.8' W				
Time 1030 PST Depth 42 fathoms				
Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ _t
0	14.1	5.13	32.27	24.08
25	12.7	5.86	32.45	24.50
50	11.9	5.45	32.65	24.81
100	10.4	3.54	33.06	25.39

Station	3	44° 35.8'	N	
Date	10-7-58	124° 24.8'	W	
Time	1120 PST	Depth 37 fathoms		
Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ _t
0	10.9	5.95	31.92	23.75
25	11.1	6.04	31.15	24.21
50	11.6	5.89	32.55	24.86
100	10.9	4.87	32.02	25.20

Station	3	44° 35.8'	N
Date	10-7-58	124° 24.8'	W
Time	1235 PST	Depth	37 fathoms

Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ _t
0	11.4	6.76	32.92	25.11
50	10.7	6.09	33.03	25.31
100		5.74	33.06	

Station	4	44° 35.8'	N	
Date	9-4-58	124° 31.7'	W	
Time	1200 PST	Depth 29 fathoms		
Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ _t
0	14.7	6.70	31.87	23.65
25	14.4	6.55	31.91	23.74
50	12.3	6.64	32.66	24.74
100	11.2	4.73	33.04	25.24

Station	4	44° 35.8'	N
Date	10-7-58	124° 31.7'	W
Time	1310 PST	Depth	29 fathoms

Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ _t
0	11.0	6.53	32.92	25.18
50	10.6	5.65	33.10	25.39
100	10.5	5.29	33.15	25.44

Station	<u>1</u>	<u>44° 35.8'</u>	<u>N</u>	
Date	<u>10-7-58</u>	<u>124° 10.9'</u>	<u>W</u>	
Time	<u>1115 PST</u>	Depth	<u>29 fathoms</u>	
Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ _t
0	10.4	5.53	33.21	25.51
50	10.1	4.62	33.48	25.77
100	9.7	3.47	33.60	25.92

Station	<u>1</u>	<u>44° 35.8'</u>	<u>N</u>
Date	<u>11-24-58</u>	<u>124° 17.8'</u>	<u>W</u>
Time	<u>1120 PST</u>	<u>Depth 42 fathoms</u>	

Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ _t
0	11.5	6.20	32.41	24.70
50	11.9	6.11	32.57	24.75
100	12.1	6.02	32.68	24.79

Station	<u>2</u>	<u>44° 35.8'</u>	<u>N</u>
Date	<u>10-7-58</u>	<u>124° 17.8'</u>	<u>W</u>
Time	<u>1200 PST</u>	Depth <u>42 fathoms</u>	

Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ _t
0	11.1	6.88	32.95	25.16
50	10.6	6.09	33.01	25.32
100	10.0	3.82	33.31	25.66

Station	<u>2</u>	<u>44° 35.8'</u>	<u>N</u>	
Date	<u>11-24-58</u>	<u>124° 17.8'</u>	<u>W</u>	
Time	<u>1200 PST</u>	Depth	<u>42 fathoms</u>	
Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ _t
0	11.4	6.08	32.86	25.06
50	11.6	6.17	32.92	25.11
100	11.8	6.08	32.97	25.08

Station <u>1</u> <u>44° 35.8'</u> N				
Date <u>1-20-59</u> <u>124° 19.9'</u> W				
Time <u>1105 PST</u> Depth <u>29 fathoms</u>				
Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ _t
0	11.0	6.32	31.27	23.90
50	11.0	6.23	31.55	24.12
100	11.1	6.26	32.39	24.74

Station <u>5</u> <u>44° 35.8'</u> N				
Date <u>1-20-59</u> <u>124° 38.6'</u> W				
Time <u>1330 PST</u> Depth <u>147 fathoms</u>				
Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ _t
0	11.1	6.53	30.32	23.15
50	11.2	6.17	32.57	24.87
100	11.2	6.14	32.75	25.01

Station <u>2</u> <u>44° 35.8'</u> N				
Date <u>1-20-59</u> <u>124° 17.8'</u> W				
Time <u>1145 PST</u> Depth <u>42 fathoms</u>				
Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ _t
0	10.8	6.47	30.66	23.46
50	11.9	6.17	32.14	24.57
100	11.0	6.17	32.39	24.77

Station <u>1</u> <u>44° 35.8'</u> N				
Date <u>1-5-59</u> <u>124° 10.9'</u> W				
Time <u>1100 PST</u> Depth <u>29 fathoms</u>				
Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ _t
0	11.2	6.47	31.91	24.36
17	11.6	6.41	32.09	24.43
35	11.5	6.32	32.25	24.57

Station <u>3</u> <u>44° 35.8'</u> N				
Date <u>1-20-59</u> <u>124° 24.8'</u> W				
Time <u>1215 PST</u> Depth <u>37 fathoms</u>				
Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ _t
0	11.0	6.59	29.52	22.55
50	11.2	6.29	32.47	24.80
100	11.5	6.17	32.79	24.99

Station <u>2</u> <u>44° 35.8'</u> N				
Date <u>1-5-59</u> <u>124° 17.8'</u> W				
Time <u>1130 PST</u> Depth <u>42 fathoms</u>				
Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ _t
0	11.0	6.53	31.73	24.25
17	10.6	6.55	31.87	24.44
35	11.0	6.38	32.14	24.57

Station <u>4</u> <u>44° 35.8'</u> N				
Date <u>1-20-59</u> <u>124° 31.7'</u> W				
Time <u>1245 PST</u> Depth <u>79 fathoms</u>				
Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ _t
0	11.4	6.36	29.42	22.41
50	11.3	6.17	32.61	24.89
100	11.4	6.17	32.68	24.92

Station <u>3</u> <u>44° 35.8'</u> N				
Date <u>1-5-59</u> <u>124° 24.8'</u> W				
Time <u>1200 PST</u> Depth <u>37 fathoms</u>				
Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ _t
0	10.5	6.94	31.27	23.99
17		6.91	31.29	
35	10.7	6.62	31.94	24.47

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Station	3	44° 35.8'	N
Date	4-21-59	124° 31.7'	W
Time	1230 P.M.	Depth	79 fathoms

Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ_t
0	10.8	5.79	31.49	24.15
17	10.6	6.60	31.73	24.32
35	10.5	6.59	32.07	24.61

Station	4	44° 35.8'	N
Date	4-21-59	124° 31.7'	W
Time	1230 PST	Depth	79 fathoms

Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ_t
0	11.0	5.59	31.47	24.06
17	11.2		31.49	24.03
35	10.9	6.73	32.03	24.50

Station	1	44° 35.8'	N	
Date	4-21-59	124° 30.9'	W	
Time	1100 PST	Depth	29 fathoms	
Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ_t
0	11.1	8.23		
17	11.0	7.50		
35	11.1	7.79		

Station	5	44° 35.8'	N
Date	4-21-59	124° 38.6'	W
Time	1300 PST	Depth	147 fathoms

Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ_t
0	11.8	5.06	30.93	23.49
17	11.5	6.94	31.17	23.76
35	11.2	6.44	31.42	23.38

Station	44° 35.8'	N
Date	6-2-59	124° 17.8' W
Time	1125 PST	Depth 42 fathoms

Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ_t
0	11.1	8.23	32.5	
17	11.2	7.67	32.5	
35	11.1	8.56	32.95	

Station	1	44° 35.8'	N
Date	6-2-59	124° 10.9'	W
Time	1045 PST	Depth	29 fathoms

Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ_t
0	12.0	5.36	33.24	25.24
50	11.8	2.71	33.75	25.6
100	11.5	1.95	33.86	25.82

Station	3	44° 35.8'	N
Date	4-21-59	124° 24.8'	W
Time	1120 PST	Depth	37 fathoms

Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ_t
0	11.0	6.82	32.09	24.51
17	11.1	6.70	32.14	24.57
35	10.6	6.67	32.27	24.75

Station	2	40° 35.8'	N
Date	6-2-59	124° 17.8'	W
Time	1125 PST	Depth	42 fathoms

Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ_t
0	12.5	6.55	31.80	24.04
50	11.8	4.67	32.80	24.94
100	11.0	2.99	33.51	25.64

Station <u>4</u>		<u>44° 12.8'</u>	N	
Date <u>6-2-59</u>		<u>124° 24.8'</u>	W	
Time <u>1200 PST</u>		Depth <u>77 fathoms</u>		
Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ_t
0	13.1	6.69	31.78	24.09
50	12.9	5.48	32.95	24.95
100	10.5	4.14	33.93	25.17

Station <u>4</u>		<u>44° 32.8'</u>		
Date <u>6-2-59</u>		<u>124° 31.7'</u>		<u>W</u>
Time <u>1225 PST</u>		Depth <u>79 fathoms</u>		
Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ_t
0	13.0	6.48	31.17	23.38
50	12.0	6.20	31.94	24.24
100	10.5	5.88	32.72	25.11

Station <u>5</u>		<u>46° 35.8'</u>		N
Date <u>6-2-59</u>		<u>124° 31.7'</u>		W
Time <u>1305 PST</u>		Depth <u>79 fathoms</u>		
Depth feet	Temp. (°C)	O ₂ ml/l	Salinity ‰	σ_t
0	13.5		30.03	22.48
50	13.0		31.06	23.37
100	12.0		32.35	24.58

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September 15, 1960

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